A REVIEW OF THE CIRRHITOID FISHES OF JAPAN

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BY

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Of Stanford University, California

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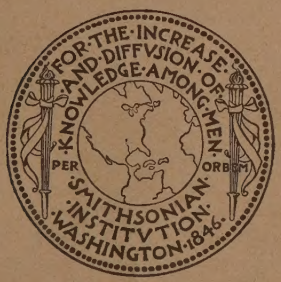

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A REVIEW OF THE CIRRHITOID FISHES OF JAPAN.

By David Starr Jordan and Albert Christian Herre.
Of Stanford University, California.

In the present paper is given an account of the fishes of the families of Cirrhitidæ and Aplodactylidæ known to inhabit the waters of Japan. It is based on the collections of Professors Jordan and Snyder, series of which are deposited in the U. S. National Museum.

KEY TO FAMILIES OF CIRRHITOID FISHES FOUND IN JAPAN.

a. Dorsal spines 10, the spinous part of the fin longer than the soft; vertebræ 10+16; eye with a suborbital shelf ..... CIRRHITIDÆ

aa. Dorsal spines 15 or more; the soft dorsal as long as spinous; anal short with acute or incisor-like vertebræ more than 10+16; nosuborbital shelf. APLODACTYIDÆ

Family CIRRHITIDÆ.

Body compressed, oblong, covered with moderate scales which are cycloid or ctenoid; dorsal and ventral outlines not similar; lateral line continuous, concurrent with the back, not extending on caudal; mouth low, terminal, with lateral cleft; eye lateral, of moderate size; premaxillaries protractile; maxillary narrow, not sheathed by preorbital; teeth small, pointed, sometimes present on vomer or palatines; cheeks without bony suborbital stay; branchiostegals, usually 6; gill membranes separate, free from the isthmus; preopercle serrate or entire; opercle unarmed; nostrils double; forehead flattened; no spines or serrations on bones of cranium; second suborbital with an internal lamina supporting the globe of the eye; dorsal fin continuous, long, the spinous part longer than the soft, usually of 10 spines, the spines not depressible in a groove; soft dorsal low; spines rather low and strong; pectoral fin short and broad as in the Cottidæ; lower half of fin with its rays simple and enlarged; the membranes deeply incised; ventral fins thoracic, but considerably behind root of pectorals, the rays 1, 5; air bladder large and complicated; pyloric cæca few; skull very compact and solid. Carnivorous fishes of the warm parts of the Pacific; apparently really allied on the one hand to the

Serranidæ, with which group Boulenger finds that the skeleton has much in common; on the other hand, they show affinities with the Scorpænidæ.

Boulenger separates the Cirrhitidæ from the Aplodactylidæ and Latrididæ, regarding the first named as a subfamily of Serranidæ.

KEY TO GENERA.

a. Scales ctenoid, large and rough; cheeks with large scales; palatine teeth present; canines small; preopercle serrulate.....*Isobuna*, 1.

aa. Scales cycloid or nearly so; preopercle more or less serrate.

b. Profile decurved or convex, scarcely incurved at the nape.

c. Palatine teeth present; scales on cheeks small.....*Cirrhitus*, 2.

bb. Profile more or less incurved or concave, above the pointed snout; teeth on palatines; preopercle sharply serrate.....*Cirrhitichthys*, 3.

1. ISOBUNA Jordan, new genus.

Paracirrhites STEINDACHNER, Fische Japans, II, 1883, p. 25 (*japonicus*) not *Paracirrhites* Bleeker, 1875, type *forsteri*.)

Body oblong, compressed, with strongly toothed scales; pointed teeth in jaws, and on vomer and palatines; upper jaw with two small canines in front; preopercle toothed. Dorsal rays X, 15; anal rays III, 7. Scales large; 6 or 7 lower pectoral rays simple, not thickened. One species known. The genus is well distinguished by the large rough scales. The name chosen by Steindachner was already in use for a large genus of the same family.

(*isobuna*, the Japanese name; *iso*, sea shore; *funa*, *buna* for euphony, gold-fish.)

Type of genus.—*Isobuna japonica*.

1. ISOBUNA JAPONICA (Steindachner).

ISOBUNA.

Paracirrhites japonicus STEINDACHNER, Fische Japans, II, 1883, p. 25 (Japan), Coll. Cristoforo Bellotti, in Mus. Milan.—JORDAN and SNYDER, Check List, 1901, p. 84.

Habitat.—Coast of southern Japan.

Head $2\frac{1}{3}$ in length; depth $2\frac{2}{3}$ eye, 5 in head; D. X, 15; A. III, 7; scales 2–33 or 34–10.

Upper profile moderately arched; head pointed in front; ventral outline to anal nearly straight. Mouth large, oblique, the maxillary extending a little beyond eye; eye 5 in head; breadth of forehead 8; snout with chin, nearly 4; lower jaw slightly projecting. Teeth slender, sharp, those of the outer row a little enlarged; a small canine on each side of upper jaw in front; Preopercle finely serrate, opercle with three short spines, the middle one sharpest and largest. Head well scaled, except lips and space before snout. Large scales on cheeks and opercles; scales on top of head small. Scales all very rough. Lateral line concurrent with back. Dorsal deeply notched, 5th and

6th dorsal spines 3½ in head, the last spine half as long as eye; first soft ray as high as highest spine. Caudal weakly concave, 1¼ in head; second anal spine strong, longer than third and weakly curved, longer than the highest dorsal spine. Ventrals not reaching vent. Pectoral with 6 or 7 lower rays simple but not thickened, the fin reaching 4th soft ray of anal. Bases of fin rays scaly.

Color golden brown, with a faint spot of golden yellow in the center of each scale along the sides (Steindachner).

This species is known from a single specimen, 15 cm. in length, in the museum at Milan. We have not seen it.

2. CIRRHITUS Lacépède.

Cirrhitus LACÉPÈDE, Hist. Nat. Poiss., V, 1803, p. 3 (*maculatus=marmoratus*).
Cirrhites CUVIER and VALENCIENNES, Hist. Nat. Poiss., III, p. 1829 (change in spelling).
Cirrhitichthys GÜNTHER, Cat., II, 1860, p. 73, in part.

Scales large, cycloid; head obtuse, rounded in profile; snout short; cheeks with small scales, teeth on vomer and palatines; jaws with small canines; preopercle finely serrate; opercle with a flat spine; dorsal rays about X, 11, anal III, 6; caudal truncate, anterior nostrils fringed; dorsal spines not fringed. Tropical Pacific.

(*cirrus*, a lock of hair.)

2. CIRRHITUS MARMORATUS (Lacépède).

Labrus marmoratus LACÉPÈDE, Hist. Nat. Poiss., III, 1801, p. 492, pl. v, fig. 3 (no locality given).

Cirrhitus marmoratus GILL, Proc. Ac. Nat. Sci. Phila., 1862, p. 107 (Hawaii n Islands).—JORDAN and EVERMANN, Fishes of Hawaiian Islands, 1905, p. 452, pl. LXX (Hawaii).—JORDAN and SEALE, Fishes of Samoa, p. 278 (Samoa).—JORDAN and STARKS, Proc. U. S. Nat. Mus., 1906, p. 699 (Yaku Island).

Cirrhites marmoratus BLEEKER, Verh. Koninkl. Ak. Wet., XV, 1875, p. 3; (Sumatra; Amboyna).—JENKINS, Bull. U. S. Fish Comm., XXII, 1902 (Sept. 23, 1903), p. 491 (Honolulu).—SNYDER, Bull. U. S. Fish Comm., XXII, 1902 (Jan. 19, 1904), p. 527 (Honolulu; Puako Bay, Hawaii).

Cirrhitus maculatus LACÉPÈDE, Hist. Nat. Poiss., V, 1803, p. 3 (no locality given).—GÜNTHER, Fische der Südsee, III, 1874, p. 71, pl. LI, fig. A (Hawaiian Islands, Society Islands, Cook Island).

Cirrhitichthys maculatus GÜNTHER, Cat. II, 1860, p. 74 (Polynesia, India, Hawaiian Islands, Ile de France).—KLUNZINGER, Fische des rothen Meeres, p. 131, in Verh. Zool. Bot. Ges. Wien, XX, 1870, p. 798 (East coast of Africa, Polynesia).—GÜNTHER, Shore Fishes, Chall., I, 1880, p. 59 (Honolulu).

Cirrhites (*Cirrhitichthys*) *maculatus* STEINDACHNER, Denks. Ak. Wiss. Wien, LXX, 1900, p. 490 (Honolulu; Laysan).

Cirrhites maculosus BENNETT, Zool. Journ., IV, 1829, p. 38 (Sandwich Islands).—RÜPPELL, Atlas, Fische, 1828, p. 13, pl. xv, fig. 1 (Red Sea).

Cirrhites alternatus GILL, Proc. Acad. Nat. Sci. Phila., 1862, p. 122 (Hawaiian Islands, young).

Habitat.—Coral islands of the tropical Pacific, north to Yakushima, southern Japan.

Head 2.75 in length; depth 2.75; eye 5.75 in head; snout 3; maxillary 2.4; mandible 2.1; preorbital 4.8; interorbital 5.75; D. X, 11; A. III, 6; scales 6–40–8; Br. 5.

Body short and stout, moderately compressed; head heavy, longer than deep; snout bluntly conic; mouth large, slightly oblique, the jaws subequal; maxillary rather long, reaching middle of pupil; patches of villiform teeth on vomer and palatines; tongue naked; jaws with bands of villiform teeth, 2 or more enlarged canines in front of upper jaw and about 4 somewhat longer canines on each side of lower jaw; dorsal profile moderately arched, the curves strongest between nape and origin of dorsal; eye moderate, high, the supraorbital rim projecting strongly above the profile; interorbital concave; nostrils moderate, nearly circular, close together, the anterior with a bushy filament about as long as diameter of pupil; origin of dorsal over base of pectoral, its distance from snout equaling its base; dorsal spines rather strong, fourth or fifth longest, about equaling snout; dorsal rays about equal to length of spines a little greater than longest spine; caudal truncate or slightly rounded when expanded; anal spines stout; second and third about equal in length, a little shorter than snout; anal rays moderately long, longest ray 2 in head; the 7 lowermost rays of pectoral thick and free at the posterior ends, the sixth from bottom longest, 1.8 in head or, measured from base of fin, 1.4 in head; scales large, smooth, arranged somewhat irregularly; nape, opercle, and breast with large scales; cheeks with very small scales, rest of head naked; preopercle finely serrate; opercle ending in a soft flap, projecting beyond a flat obscure spine; gill-membranes broadly connected across the isthmus.

Color in life, body marbled and blotched with bluish olivaceous, brownish and white, with numerous red spots of varying sizes, the white appearing as 5 ill-defined vertical bars; head bluish white with irregular lines of yellowish or orange brown, these palest on cheek; lower jaw pale blue with cross-markings of darker blue; base of pectoral pale with yellowish-brown blotches; posterior portion of back with 4 large reddish-brown blotches, the first under the last 2 dorsal spines, the second under sixth and seventh dorsal rays, the third under last dorsal rays, fourth on upper edge of caudal peduncle; spinous dorsal pale-yellowish blue, crossed by 3 series of large orange-red spots on the membranes, the uppermost series least complete; tips of membrane of spinous dorsal whitish, above black blotches; soft dorsal pinkish with a series of redder spots along the base; caudal pale pinkish, crossed by about 4 series of bright blood-red blotches; anal pale rosy, whitish at base, with 3 series blood-red blotches; an olive

blotch near middle of first and second spines; pectoral and ventral pale rosy.

This well-known species, abundant among the coral islands throughout the Pacific, has been once taken in Japan, a specimen having been sent from the offshore island of Yaku in southern Japan. A beautiful colored figure by Capt. Charles B. Hudson is given by Jordan and Evermann. Of the closely related genus, *Paracirrhites* Bleeker, distinguished by absence of palatine teeth, no species has been recorded from Japan. *Amblycirrhitus* Gill[a] is probably identical with *Paracirrhites*.

(*marmoratus*, marbled.)

3. CIRRHITICHTHYS Bleeker.

Cirrhitichthys Bleeker, Naturk. Tydschr. Nederl. Ind., X, 1856, p. 474 (*graphidopterus=aprinus*).

Cirrhitopsis Gill, Proc. Ac. Nat. Sci. Phila., 1862, p. 109 (*aureus*).

Body oblong, the back arched, the profile somewhat concave at the nape on account of the more or less projecting snout; preopercle sharply serrate; preorbital serrulate or entire; no canines; teeth on vomer and palatines; branchiostegals 6; scales large, slightly ctenoid or cycloid; dorsal rays X, 12; anal III, 6 or 7; first dorsal ray elongate; dorsal spines moderate; second spine elongate; pectoral with 6 simple rays; first soft ray of dorsal sometimes elongate.

Species of the tropical Pacific, one of them found in Japan. It differs from *Cirrhitus* mainly in the more produced snout and notched or incurved profile.

(*Cirrhites;* ἰχθύς fish.)

3. CIRRHITICHTHYS AUREUS (Schlegel).

OKIGONBE (OFFSHORE SPRITE).

Cirrhites aureus Schlegel, Fauna Japonica, Poiss., 1843, p. 15, pl. VII, fig. 2, (Nagasaki).—Richardson, Ichth. China, 1846, p. 239 (Canton).—Jordan and Snyder, Check List, 1901, p. 85.

Cirrhitichthys aureus Günther, Cat., II, 1860, p. 75 (Canton, China).—Namiye. Class. Cat., 1881, p. 95 (Awa).—Ishikawa and Matsuura, Prel. Cat., 1897, p. 52 (Boshu, Kagoshima).

Habitat.—Southern Japan to China (and to India, if *Cirrhitichthys*[b] *bleekeri* Day, from Madras, should prove to be the same, which is not probable.)

Head 3 in length to base of caudal; depth 2¼; eye 4⅔ in head; D. X, 12, A. III, 6; scales 4–42–9, P. 14, with 6 rays simple.

[a] Proc. Ac. Nat. Sci. Phila., 1862, p. 106 (*fasciatus*).

[b] *Cirrhites fasciatus* Jerdon, Madras Journal, 1851, p. 132 (Madras); not of Cuvier and Valenciennes.

Cirrhitichthys bleekeri Day, Fishery Rept., CXCI, no. 207.

Cirrhitichthys aureus Day, Fishes India, 1876, p. 145, pl. xxxv, fig. 5, Madras.

Body short, compressed, the profiles above and below strongly arched; the outline incurved at the nape; snout short, scarcely longer than eye; mouth small, the jaws equal; outer teeth of lower jaw enlarged; villiform teeth on vomer and palatines. Scales large, mostly cycloid, the smaller slightly ctenoid. Preopercle strongly serrate; cheeks with 4 rows of scales; suborbital rim and preorbital apparently scaleless, but with mucous striæ; opercle scaled; opercular spine obsolete; supraorbital rim somewhat elevated; interorbital area very narrow, $1\frac{3}{5}$ in eye. Branchiostegals 5. Gill-rakers short and blunt, about 6+6.

First soft ray of dorsal filiform (broken in specimen); dorsal fin not notched; fourth spine not elevated, 2 in head; a slight fleshy tag behind tip of each spine; second anal spine enlarged, $1\frac{2}{3}$ in head; anal fin truncate; pectoral with 6 simple rays, the longest reaching beyond origin of soft rays of anal, a little longer than head; caudal lunate.

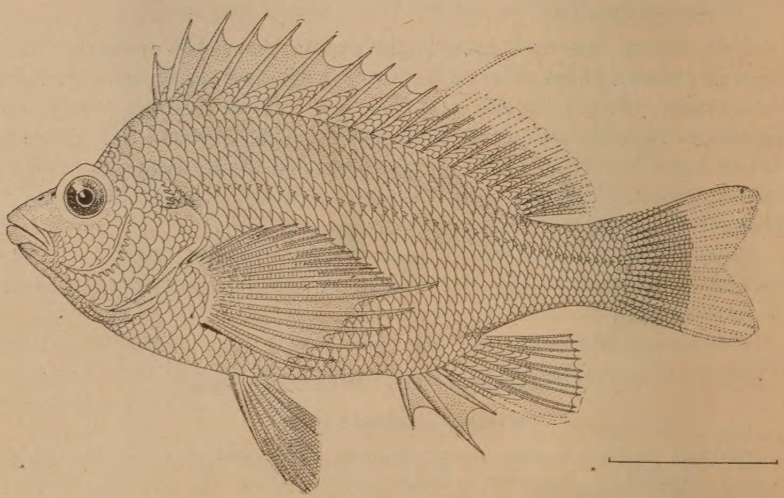

FIG. 1.—CIRRHITICHTHYS AUREUS.

Color uniform pale, doubtless orange or yellow in life, with no traces of markings of any kind. Of this rare species we have seen but one specimen, $4\frac{1}{8}$ inches in length. It was taken at Misaki, and was presented to us by Professor Mitsukuri. It probably lives in rather deep water. It is the type of the subgenus *Cirrhitopsis* Gill, said to be distinguished from *Cirrhitichthys* by the scaly suborbital. The suborbital ring is said to be naked in the type of *Cirrhitichthys* (*graphidopterus* = *aprinus*). We are, however, unable to find true scales on the narrow suborbital of *C. aureus*. The preorbital has striæ or muciferous ducts resembling scales. The species is very close to *Cirrhitichthys bleekeri* Day, of India, and it may prove to be the same, which is the latest judgment of Doctor Day. The two have the same numbers of

scales and fin rays, but *C. bleekeri* is said to be much more elongate, the depth, 2⅔ in length (3¾ in total length, with caudal); the eye 3½ in head; the color rosy, with pale streaks, a large black blotch below soft dorsal, a dark blotch behind opercle; caudal with red spots; dorsal and caudal banded. The Indian species is probably different from the Japanese.

(*aureus*, golden.)

Family APLODACTYLIDÆ.

This family agrees with the Cirrhitidæ in having the lower pectoral rays simple, elongate, and thickened, and in having the ventrals inserted well behind the pectorals.

It differs technically, according to Boulenger, in the absence of a suborbital shelf, and also in the much larger number of dorsal spines, the soft dorsal also being many rayed. Anal fin short, vertebræ more than 10 + 16, teeth acute or incisor-like. Shore fishes of the warm parts of the Pacific.

a. CHEILODACTYLINÆ. Teeth pointed not incisor-like, dorsal spines about 18, the spinous part of the fin not longer than the soft; preopercle entire.

b. Anal fin short, III 8, or III 9; dorsal fin deeply notched, the fourth spine elevated; soft dorsal of about 30 rays ..... *Goniistius*, 4.

4. GONIISTIUS Gill.

Goniistius GILL, Proc. Acad. Nat. Sci. Phila., 1862, p. 120 (*zonatus*).
Zeodrius CASTELNAU, Proc. Linn. Soc. N. S. W., III, 1878, p. 377 (*vestitus*).

Body highest anteriorly, the anterior profile steep and compressed. Head small; cheeks and crown scaly; preopercle entire; opercle ending in a flat spine; mouth small, the lower jaw included; teeth small, in several series, the outer enlarged; vomer and palatines toothless; branchiostegals 6; adult with a pair of tubercles above eye and one above snout; scales moderate; dorsal fin very long, the spinous and soft parts about equal, the rays about XVII–30, the fin deeply notched, the fourth spine much elevated and curved backward; anal with three small spines, the rays about III, 8, the last rays rapidly shortened; pectorals with about 6 simple rays, of moderate length; ventrals well behind pectorals; caudal forked; body with oblique black bands. Species about 6, of the tropical Pacific. The genus is closely related to *Cheilodactylus*, from which it differs mainly in the elevated, notched dorsal, the soft dorsal being longer than in *Cheilodactylus*. From *Dactylosparus* Gill (*D. carponemus*) the short anal distinguishes *Goniistius*. *Goniistius vittatus* from Hawaii is allied to *G. zebra*, and still other species inhabit Australian waters.

(γωνία, angle: ἱστίον, sail: for dorsal fin.)

KEY TO SPECIES.

a. Body with about 9 oblique dark brown cross-bands, two on the head, the second across opercle, and base of pectoral; membrane of opercle jet-black; a lengthwise band along dorsal fin; ventral fin pale; caudal with several round white spots. D. XVIII, 32. A. III, 8. Scales 60. Fourth dorsal spine $1\frac{2}{3}$ in head ..... *zonatus*, 4.

aa. Body with 7 oblique jet-black bands; 3 of these on the head, the second extending across eye and across base of pectoral, the seventh covering most of caudal peduncle and lower lobe of caudal fin, ventral fin black; fourth, fifth, and sixth bands extending across dorsal fin. Dorsal rays XVII, 34. Anal III, 8. Scales, 70; fourth dorsal spine $1\frac{1}{3}$ in head ..... *zebra*, 5.

4. GONIISTIUS ZONATUS Cuvier and Valenciennes.

TAKANOHADAI HAWK-PORGY. TAKAPA HAWKLET. KIKORI WOOD-CHOPPER.

Labre du Japon KRÜSENSTERN, Reise, Atlas, 1809, p. 63, pl. XLIII, fig. 1 (Japan).
Chilodactylus zonatus CUVIER and VALENCIENNES, Hist. Nat. Poiss., 1830, V, p. 365, pl. CXXIX (Japan).—SCHLEGEL, Fauna Japonica, Poiss., 1843, p. 64, pl. XXIX (Nagasaki).—RICHARDSON, Ich. China., 1846, p. 239 (Canton); Proc. Zool. Soc., London, 1850, p. 66.—RICHARDSON, Ann. Mag. Nat. Hist. (2), 1851, VII, p. 282.—BLEEKER, Nieuwe Nalez., Japan, 1857, p. 83 (Nagasaki).—GÜNTHER, Cat. Fish., II, 1860, p. 82 (Canton; Japan).—STEINDACHNER and DÖDERLEIN, Fische Japans, II, 1881, p. 27 (Tokyo).—NAMIYE, Class. Cat., 1881, p. 95 (Tokyo).—NYSTRÖM, Svensk. Vet. Ak. Handl., XIII, 1887, p. 18 (Nagasaki).—ISHIKAWA and MATSUURA, Prel. Cat., 1897, p. 52 (Tokyo, Riu Kiu Islands).—JORDAN and SNYDER, Proc. U. S. Nat. Mus., XXIII, 1900, p. 358 (Tokyo); Proc. U. S. Nat. Mus., XXIII, 1900, p. 752 (Yokohama); Check List, 1901, p. 84 (Yokohama).

Habitat.—Coasts of Japan and southern China, north to Tokyo, generally common.

Head $3\frac{1}{3}$ in length to base of caudal; depth $2\frac{2}{3}$; eye $4\frac{1}{3}$ in head; D. XVII, 32; A. III, 8; P. 13, with 6 rays simple; scales 9–60–16.

Body oblong, deep, compressed, the lower profile nearly straight, the upper compressed and highest forward; steep and nearly straight from tip of snout to front of dorsal. Mouth small, the lips produced, thick and fleshy; small teeth in jaws only; 2 fringed flaps over the anterior nostril, the posterior flap double the size of the anterior one; posterior nostril without flaps or processes; interobital space broad, 4 in head; snout and preorbital scaleless; top of head, cheeks and opercles with small or minute scales; preopercle entire; opercle entire, rounded. Branchiostegals 6; gill-rakers 14+8, short, stout. Dorsal deeply notched, second spine equal to diameter of eye, high, about 2 in head; anal spines rather small, the third $3\frac{1}{3}$ in head; last soft rays much shortened, the longest a trifle more than 2 in head; pectoral almost as long as head, not quite reaching vent; ventrals moderate inserted opposite end of lowest simple pectoral ray and reaching beyond vent; caudal deeply and evenly forked. Scales moderate, cycloid; base of pectoral scaled; a scaly sheath about base of anal and dorsal; caudal largely scaled.

Color of body olive brown, paler on belly, about nine parallel oblique crossbars of deep brown, bright dark olive-orange in life, a little narrower than the interspaces; the first extending across the eye and cheek, the second from nape to base of pectorals, forming a jet-black blotch on opercle, and a dark bar across base of pectoral; the third, fourth, fifth, and sixth extend diagonally backward from dorsal to belly, where they disappear; the seventh, eighth, and ninth bands encircle the body, the seventh including the posterior portion of the soft dorsal; these three bands are confluent along the lateral line; dorsal fin brown; with a darker basal shade and one or two pale spots posteriorly. Caudal dark brown, with large round white spots about twelve in number; two or three similar white blotches on caudal peduncle; anal and ventrals black; pectorals uniform, pale brown

FIG. 2.—GONIISTIUS ZONATUS.

except the scaly base which is marked by a dusky crossbar; lips blackish, edged with rosy brown; two dark lengthwise lines across cheeks, from preorbital backward.

This description is taken from a specimen 8 inches long from Wakanoura. Larger examples are similarly colored, but the dark bands, always paler than in *Goniistius zebra*, grow fainter with age, and orange specks sometimes appear between them. The spots on the caudal fin are obsolete in some old examples.

Of this common species, we have specimens from Tokyo, Misaki, Wakanoura, Hakata, and Nagasaki. It is a food-fish of moderate importance and is called Takanohadai, or hawk-porgy, Tai being the common name applied to *Pagrus major* and all similar fishes.

(*zonatus*, banded.)

5. GONIISTIUS ZEBRA (Döderlein).

Cheilodactylus gibbosus STEINDACHNER and DÖDERLEIN, Fische Japans, II, 1883, p. 27, pl. VII, fig. 2 (Tokyo; not of Richardson; the synonymy given being all incorrect).—NYSTRÖM, Svensk. Vet. Ak., Handl., XIII, 1887, p. 18 (Nagasaki).—JORDAN and SNYDER, Check List, 1901, p. 84.

Cheilodactylus zebra DÖDERLEIN, Fische Japans, II, 1881, p. 29 (Tokyo; same specimen; a provisional name.)

Habitat.—Coast of Japan, known from Tokyo, Wakanoura, and Nagasaki.

Head 2⅔ in length; depth 3½. Eye 3¾ in head; snout about 3; interorbital width 4. D. XVII, 32. A. III, 8. Scales 10–70–15.

Body oblong, much compressed, the lower profile relatively straight, the upper much compressed, and elevated forward; a deep notch at the nape and another at the nostril; mouth small; lips thick; teeth in jaws only, the outer a little enlarged; a blunt projection over each eye growing larger with age, and one at the nostril; snout and preorbital scaleless; top of head, cheeks, and opercles with small scales; preopercle entire; opercle ending in two flat points; gill-rakers 12—5.

Dorsal deeply notched, the fourth spine 1⅓ in head; anal spines moderate, the second thickest; last soft rays rapidly shortened, the longest 1⅔ in head; pectoral longer than head, reaching vent; ventrals moderate, inserted well behind pectorals; caudal deeply and evenly forked.

Body rosy brown, with oblique cross bands of deep brown or rather orange black; three of these on the head, the second across eye and base of pectoral, the third forming a large blotch on the opercle; fourth including first three dorsal spines and extending across to ventrals fading below, the ventral fins being jet black; fifth and sixth bands extending on dorsal and ceasing near middle of side, the sixth confluent below with seventh; seventh fully confluent with eighth, leaving only three spots of the pale ground color between them; seventh and eighth not extending on dorsal, but covering almost all of caudal peduncle and the lower half of caudal fin. Anal fin a little dusky; fins pale except where crossed by the extension of the dark cross bands.

From Steindachner's excellent figure our specimen differs in the greater extension downward of the fourth band, and in the partial separation of the seventh and eighth bands. Of this species we have in hand a single specimen 10 inches long. It was found in the market of Yokohama by Pierre L. Jouy. A specimen was also seen at Wakanoura. It is otherwise known only from the specimen of Steindachner, and that recorded by Nyström. The species is certainly distinct from *Goniistius gibbosus* (Richardson) of the coast of Australia, with which Steindachner has confounded it, and probably from *Goniistius vestitus* (Castelnau) and *Goniistius quadricornis* (Günther), both Australian species. *Goniistius cittatus* Garrett, of Hawaii, which Steindachner

calls a "*Farbenvarietät*," is also nearly related. It is, however, clearly distinct from *Goniistius zebra*, as will appear from a comparison of Steindachner's excellent figure with that of *Cheilodactylus vittatus* (properly *Goniistius vittatus*) in Jordan and Evermann's report on the Hawaiian fishes.

(*zebra*, the zebra.)

SUMMARY.

Family CIRRHITIDÆ.

1. *Isobuna* Jordan, 1907.

1. *japonica* (Steindachner), 1883.

2. *Cirrhitus* Lacépède, 1803.

2. *marmoratus* (Lacépède), 1801; Yaku Island.

3. *Cirrhitichthys* Bleeker, 1856.

3. *aureus* (Schlegel), 1843; Misaki.

Family APLODACTYLIDÆ.

4. *Goniistius* Gill, 1862.

4. *zonatus* Cuvier and Valenciennes, 1830; Tokyo, Misaki, Wakanoura, Hakata, Nagasaki.

5. *zebra* (Döderlein), 1883; Yokohama, Wakanoura.